2014

AN ANALYSIS OF THE EFFECTS OF THE 2003 AND 2011 ACGME WORK HOUR RULES ON MEDICAL RESIDENT SATISFACTION AT AN INDEPENDENT ACADEMIC MEDICAL CENTER

Rachael E. Trout
Rachael.E.Trout@gmail.com

AN ANALYSIS OF THE EFFECTS OF THE 2003 AND 2011 ACGME WORK HOUR RULES ON MEDICAL RESIDENT SATISFACTION AT AN INDEPENDENT ACADEMIC MEDICAL CENTER

A dissertation submitted to
the Graduate College of
Marshall University
in partial fulfillment of
the requirements for the degree of
Doctor of Education
in
Educational Leadership
by
Rachael E. Trout
Approved by
Dr. Dennis M. Anderson, Committee Chairperson
Dr. John C. Linton
Dr. Edna Meisel
Dr. Louis Watts

Marshall University
August 2014

DEDICATION

This dissertation is dedicated to my family, who will likely never read this body of work in its entirety, but will pretend they had. Without your continued love and support, I would never have started this project, let alone completed it.

To my parents, Thomas Keith and Ann Carolyn Bailey, for raising me to believe I could accomplish whatever I desired and impressing upon me the importance of education.

To my husband, Johnny, for supporting all my seemingly endless academic endeavors. I love and appreciate you more than words can say. Thank you.

To my children, Natalie and Nathan, you are my shining lights and the reason I breathe. Always remember, you can be anything you desire, so long as you make enough money to pay back the student loans.

ACKNOWLEDGEMENTS

This dissertation would not have been possible without the help and support of a number of people. Above all, I express never-ending gratitude to my doctoral committee. Dr. Dennis Anderson, my committee chairman, had unwavering faith in me. His sharp wit kept me smiling and his barrage of emails kept me researching and writing. All of the research and writing would have been for naught had Dr. Edna Meisel not picked me up when I thought all was lost. Her determination to save me from my own oversight gave me inspiration, and her uncanny ability to make statistics fun had me enjoying the part I had anticipated loathing the most. Dr. Louis Watts provided sage advice and went over and above to help me achieve my deadlines. His wisdom and comments provided much needed direction. Finally, to Dr. John Linton, another individual with an incredible wit, who added this committee burden to his already full plate, I will forever be thankful.

I also want to thank and acknowledge Sharon Hall, President, Charleston Area Medical Center Health Education and Research Institute. Without her suggestion and support, this document would never have come to light. She is a shining example for professional women everywhere.

Thank you to West Virginia University Physicians of Charleston for supporting education via tuition reimbursement as an employee benefit. I would never have journeyed this far without the financial support.

There are so many who provided continued support and assistance: Wendy VanDyke Evans, who supplied editing support; Karen Frazier, who assisted with reference checks; Bill Bissett, who emailed, called and harassed me during the final year; and, Rob Cagna, who re-educated me on library resources – just to name a few.

Thank you to everyone for the encouragement.

CONTENTS

LIST OF TABLES

.

ABSTRACT

The purpose of this research was to determine what effects, if any, the 2003 and 2011 ACGME work hour rules had on medical resident satisfaction at an independent academic medical center in the United States. This research analyzed results of a survey administered by an independent academic medical center utilizing its own instrument of measure. Items reviewed to determine self-perceived satisfaction included questions related to program director effectiveness, resident input, quality of life, and satisfaction with program. Four comparisons were reviewed and analyzed for statistical significance utilizing the Mann-Whitney U non-parametric test for independent samples. The results indicated neither the 2003 or 2011 ACGME mandated work hour rules had an immediate effect on resident perceived satisfaction; however, there was a statistically significant increase in resident perceived satisfaction over a period of 10 years.

CHAPTER 1

INTRODUCTION

The process of becoming a physician who can practice in the United States is a long and arduous one. Once an individual completes a bachelor's degree in a science-related curriculum or field, he or she must gain admittance to a medical school. Upon successful completion of four years of medical school, the new physician must apply for admission to a residency training program recognized by the Accreditation Council for Graduate Medical Education (ACGME), which is responsible for the accreditation of post-graduate medical training programs within the United States. These residencies prepare physicians for specialty practice, such as surgery, pediatrics, or internal medicine.

Most residency programs require three to five years of training before the graduate can be approved to take a specialty board examination, referred to as being "board eligible." Once the examination is successfully completed, the physician is "board certified" for practice in that specialty. For sub-specialty and super-sub-specialty training, physicians must complete additional training beyond that of general residency. While some rural localities will allow a physician to practice independently with only an internship, which is one year of post-graduate training, the majority of institutions and healthcare payers will only allow those deemed board certified or board eligible to practice without supervision.

Two important areas of emphasis in graduate medical education (GME) training over the past decade have been the topics of resident satisfaction and resident work hours. The ACGME has set forth a series of Common Program Requirements that must be met by any program offering graduate medical education. The requirements include, but are not limited to, the need

for a competent Program Director who is board certified in the relevant specialty and oversees the residency. ACGME states that residents should expect Program Directors to be available for feedback that is both formative and summative. Directors are to be knowledgeable and communicative of what is expected of residents and are expected to provide guidance on improvement to all residents. With regard to faculty and support, ACGME requires that residents should expect faculty who are both medically and clinically knowledgeable, and have respect for residents. Additionally residents should expect the availability of necessary professional support for administration of the program (ACGME, 2011).

Compliance with these Common Program Requirements is mandatory and is reviewed by all ACGME committees. Failure to comply with the Common Program Requirements can result in the withdrawal of ACGME accreditation.

Background

In the early years of medical education, residency was the term used for post-graduate physicians who literally resided in a hospital. These "residents," as they were called, were mandated to be available around the clock to provide patient care and gain valuable clinical experience that could be obtained only by caring for the ill and infirm at the patient's bedside. Today's residents are not expected to live in the hospital; however, they are expected to be available to care for patients while still being afforded adequate rest and time away from all clinical and educational obligations.

In addition to serving as a training ground for post-graduate physicians, residency serves as a tool to recruit medical students into a specific specialty and even to the location they select for their post-graduate training. In the past decade, greater influence has been placed on residents' satisfaction with their program as a source of recruitment for medical students and a

barometer for the accrediting council to determine whether residency programs are meeting the full needs of their students both professionally and personally.

ACGME expects programs to allow residents to be an integral part of the program and have input and reasonable independence in both the management of the program and the care of patients. To this end, ACGME states that residents should expect to have input in faculty evaluations, the opportunity to confidentially evaluate the program, adequate supervision and/or independence, and the ability to express their opinions without fear of reprisal (ACGME, 2011).

Traditionally, residents have been viewed as those who performed meaningless "grunt" work while being available 24 hours a day, seven days a week. Programs were not limited in the number of hours they could require a resident to work or required to allow a certain amount of sleep between shifts. To improve the overall residency experience, during the past decade, ACGME has placed stringent limitations on work or duty hours and the programs' documentation of their compliance with these limits. Currently ACGME states that programs are required to abide by all duty hours as outlined in its policies in an effort to allow residents to have a balance of life, adequate rest, and participation in family and community activities (ACGME, 2011).

According to ACGME, its resident survey serves as a tool to promote resident input in the accreditation process. The general consensus is that if residents believe themselves to be a valuable part of the program, they will perform better and produce improved patient outcomes. This gratification should result in residents having a positive influence on the recruitment of more residents and assisting in creating a cycle of excellence in both the teaching/learning environment and the satisfaction with the residents' chosen field (Levenberg, 2011).

ACGME resident surveys on satisfaction and adherence to the Common Program Requirements, including work hours, carry much weight with accreditation bodies; however, some programs question the accuracy of resident surveys gathered by outside agencies when compared with their internally-generated measures of resident satisfaction. Fahy, Todd, and Paukert (2010) independently reviewed their own internal resident satisfaction utilizing questions similar to the ACGME survey and found that their residents reported a more favorable satisfaction score than that reflected in the ACGME survey of their residency. Part of their summary recommendation included having programs initiate annual in-house resident surveys modeled on the ACGME survey questions in an effort to prepare residents for the ACGME survey and to provide additional internal controls to facilitate resident satisfaction.

Recognition of the importance of resident satisfaction has accelerated research related to residents' perceptions of their jobs, training, and lifestyle. Sullivan, Bucholz, & Yeo (2012) established that collegial interactions between a resident and the supervising physician, referred to as the "attending," were associated with greater resident satisfaction and resulted in a more favorable review by residents. They also noted that collegial interactions among medical colleagues have been suggested to positively affect overall job satisfaction of residents.

Shanafelt, Bradley, and Wipf (2002) reported that poor resident job satisfaction is a significant component of resident-perceived "burnout" that has been thought to be responsible for a significant number of self-perceived medical errors. West, Huschka, and Novotny (2006) supported the notion that poor resident job satisfaction increased the resident's self-reported perception of sub-par patient care and medical errors.

One of the most significant changes to occur in residency training was the implementation of the resident work hour rule that went into effect on July 1, 2003. This rule,

promulgated by ACGME, states that resident duty hours must be limited to 80 hours per week, averaged over a four-week period, inclusive of all in-house call activities (ACGME Duty, n.d.). There are allowable exceptions to the rule; however, the strict limits on duty hours, time off, and time away from the educational environment are detailed and monitored by ACGME and are a significant part of the resident survey.

Kashner et al. (2010) studied the effects of the 2003 resident duty hour changes on perceived job satisfaction as reported by residents at a program housed in the Department of Veterans Affairs. They found a significant increase in resident job satisfaction after the July 1, 2003, implementation of the work hour rules.

Other studies suggest that the initial work hour rule changes of 2003 had a mild-to-moderate improvement in resident satisfaction and well-being. In July 2011, ACGME implemented its second phase of duty hour restrictions for residents, which included further limits on work hours, time off, and time away from the educational environment. The literature on the second phase of duty hour limitation is sparse; however, an initial study that included 51 residency programs at 14 university- and community-based GME institutions concluded that even though residents were working fewer hours under the 2011 duty hour restrictions, no significant changes occurred in hours slept or the residents' self-reported general well-being. Surprisingly, the study found that a larger percentage of interns reported concern about making a serious medical error (Sen et al., 2013).

Problem Statement

Teaching hospitals across the nation depend on residency training programs to provide valuable healthcare services by providing residents to staff the hospitals. Failure to maintain certification would be catastrophic to these hospitals, considering that most of the hospitals' physicians (residents) would no longer be available to provide uninterrupted critical services.

Two significant portions of the ACGME review are resident satisfaction and adherence to ACGME work hour rules. In order to comply with the ACGME requirements, a program must monitor resident satisfaction and make tangible efforts to ensure a positive medical resident experience. Furthermore, programs must provide clear evidence of compliance with work hour rules. Failure of a program to meet ACGME-mandated requirements for work hours could result in the residency program being terminated. Additionally, programs with reportedly dissatisfied residents can trigger site visits by ACGME regulating bodies. A formal citation or loss of a residency program could severely disadvantage the local community and place unattainable expectations on independent physicians to staff and maintain quality patient services and outcomes.

1. Is there a significant difference in medical residents' perceived overall program satisfaction as evidenced on the Independent Academic Medical Center's Resident Satisfaction Survey before and after implementation of the 2011 ACGME work hour rules?
2. Is there a significant difference in medical residents' perceived overall program satisfaction as evidenced in the Independent Academic Medical Center's Resident Satisfaction Survey pre- and post-Work Hour Rule implementation for the years 2002 and 2012?
3. Is there a significant difference in First-Year/Intern residents' perceived overall program satisfaction as evidenced in the Independent Academic Medical Center's Resident Satisfaction Survey pre- and post-Work Hour Rule implementation of 2011?

Purpose of the Study

The purpose of this study is to explore how residents perceive their residency programs' compliance with the ACGME Common Program Requirements, specifically the section devoted to resident satisfaction and work hours. The study will seek to examine any variation in these perceptions as they relate to both the 2003 and 2011 work hour rule changes. The results will be

meaningful for any Designated Institutional Officer or Program Director appointed to regulate and administer a residency program. The significance of resident satisfaction as well as a program's adherence to work hour rules is instrumental in determining the accreditation status of a residency program. Furthermore, accreditation status and resident satisfaction are cited as important variables in the recruitment of future residents.

The study will evaluate any statistically significant variations between resident satisfaction measured both pre- and post-work hour rule implementation in 2003 and 2011. Findings from this study will contribute to the current body of knowledge in residency education and provide insight into perceived resident satisfaction as well as assess the effects of work hour rules on resident satisfaction at an independent academic medical center.

Significance of the Study

The results of this study can have a significant impact on both the operational and educational processes that occur in graduate medical education. Should the results indicate that there is a specific area or discipline of resident training that reflects statistically significant resident dissatisfaction, operational and/or educational changes could be implemented to help increase those satisfaction results. Any successful intervention implemented to increase resident approval could be reported to the ACGME for potential implementation by other institutions offering graduate medical education.

The subject of work hour rules for residents is continually up for debate. Several studies of resident satisfaction have taken place since the 2003 work hour rule implementation; however, publications have been limited on the effects, if any, that the 2011 work hour rule implementation had on resident satisfaction. Results of this study could further enhance the body of knowledge as it relates to the 2011 work hour rule implementation and potential effects on resident satisfaction.

Operational Definitions

The following terms have been operationally defined for the study:

1. Residency Program - an ACGME-accredited residency program for physician graduates. Osteopathy graduates may complete an allopathic residency; however, allopathic physicians may not attend an osteopathic residency.
2. D.O. - a graduate of an accredited osteopathic school of medicine.
3. M.D. - a graduate of an accredited allopathic school of medicine.
4. Resident - an individual who has earned a medical degree (M.D. or D.O. for United States graduates, or MBBS, MBChB, BMed. for foreign graduates) and who practices medicine under the supervision of fully-licensed physicians.
5. Attending - a fully-licensed, board-certified or board-eligible physician who has completed both medical school and residency and who provides education and guidance to medical students and residents.
6. First-Year Resident - a resident in the first year of post-graduate medical education training. (Synonymous with Intern and PGY-1.)
7. Intern - a resident in the first year of post-graduate medical education. (Synonymous with First Year Resident and PGY-1.)
8. PGY-1- Program Year 1 - a resident in the first year of post-graduate medical education. (Synonymous with First-Year Resident and Intern.)
9. PGY-2 - Program Year 2 – a resident in the second year of post-graduate medical education.
10. PGY-3 - Program Year 3 – a resident in the third year of post-graduate medical education.
11. PGY-4 - Program Year 4 - a resident in the fourth year of post-graduate medical education.
12. PGY-5 - Program Year 5 - a resident in the fifth year of post-graduate medical education.

13. ACGME - The Accreditation Counsel for Graduate Medical Education, which is responsible for accreditation of allopathic post-graduate medical education programs in the United States.
14. Common Program Requirements - a defined list of requirements for each resident training program as prescribed by ACGME for accreditation.
15. Duty Hours - both clinical and academic activities related to a residency program, including patient care, administrative duties, in-house call, and conferences. Duty hours do not include reading and preparation time spent away from the duty site.
16. Independent Academic Medical Center - a community-based hospital facility or institution that operates independently of medical school ownership or governance while maintaining a medical school affiliation.
17. Program Director - a physician with board certification and experienced training in Graduate Medical Education who is administratively responsible for the specialty resident program.
18. Designated Institutional Officer - the individual administratively responsible for all residency programs that an institution sponsors.

Method

This study is a retrospective review of aggregate data collected by an independent academic medical center, utilizing its own measurement instrument, for the years 2002, 2004, 2010, and 2012. The population included residents participating in residency programs of family medicine, internal medicine, medicine-pediatrics, general psychiatry, obstetrics and gynecology, general surgery, pediatrics, and medicine-psychiatry. The total sample size (n) is 429, consisting of the following items: 2002 n=88, 2004 n=100, 2010 n=116, and 2012 n=125. The study was submitted to the Institutional Review Board of both Marshall University and that of the independent academic medical center and was approved by both.

The independent academic medical center's data were compared among years. The study used descriptive statistics to answer the research questions. The data were entered into SPSS for statistical analysis utilizing the Mann-Whitney U non-parametric test for independent samples to compare results between groups.

Limitations

The limitations of this study are as follows:

- The survey captures a limited point in time during residency training. The respondents' experiences at the time of response could result in a significant difference in the individuals' perceptions of satisfaction.
- The quality of the data is dependent on the respondents' personal definitions of satisfaction.
- Data were acquired utilizing an instrument, developed by the independent academic medical center, which has not been validated outside of this research.
- Data were acquired at a single independent academic medical institution and may not reflect perceptions of those in other ACGME-accredited institutions or regions.

Summary

ACGME is placing significant emphasis on resident satisfaction as a barometer in determining the accreditation of post-graduate physician training programs (ACGME, 2011). Failure of a program to recognize and address the importance of resident satisfaction can result in the loss of program accreditation, which can affect the supply of healthcare services. Furthermore, as noted by Gallery, Whitley, Klonis, Anzinger and Revicki (1992), lack of job satisfaction can lead to depression, "burnout," and poor job satisfaction with a choice of career in healthcare. This study will contribute to the body of knowledge regarding resident satisfaction as a critical variable in graduate medical education.

The amount of work time allowed by residents was both clarified and restricted by ACMGE in the years 2003 and 2011. Today, as the demand for healthcare providers continues to increase, the amount of time residents are allowed to be active in the clinical setting is becoming more restrictive. The goals of the restriction are to increase resident well-being (satisfaction) and reduce self-perceived medical errors. This study will contribute to the body of knowledge regarding ACGME-mandated work hour rules in both 2003 and 2011 and what effect, if any, those changes had on residents' self-reported satisfaction.

CHAPTER 2

REVIEW OF THE LITERATURE

This chapter gives background and reviews the current literature in the field of graduate medical education. It begins with a brief history of medical education in the United States, culminating in the formation of the Accreditation Council on Graduate Medical Education. The second section contains a critical review of the literature concerning the ACGME's resident work hour rules of 2003 and 2011 and how they have affected resident satisfaction and quality of life.

Introduction to the Literature

A familiarity with the history of medical education in the United States is important to an appreciation of the current status of residency education, as well as the challenges facing accreditation bodies, training programs, and residents. An understanding of the history of both medical education in general and, specifically, graduate medical education will help provide a clear view of the current status of residency training and the various stressors associated with the rigors of graduate medical education. In addition, an awareness of the unique factors related to the experience of interns, or first year residents, is essential.

The early years of medical education in the United States consisted of a crude apprenticeship system that involved a youth with an interest in medicine being indentured to a practitioner. The apprentice was assigned tasks of running errands, mixing poultices, and supplying general assistance. Towards the end of the apprenticeship, the student would be allowed to take part in the daily practice of his master by bleeding patients, pulling teeth, and

delivering babies. The quality and length of training varied, depending on the knowledge of the master and his opinion of the student (Flexner, 1910a).

On May 7, 1847, a group of 250 "delegate" physicians from 28 states met at the Academy of Natural Sciences in Philadelphia and approved a resolution to establish the American Medical Association (AMA). During this inaugural meeting, the group elected Dr. Nathaniel Chapman as their first President, adopted the first Code of Medical Ethics, and instituted the first (albeit limited) nationwide standards for obtaining a medical degree ("AMA: The Founding," n.d.). In 1883, Nathan Davis, then president of the AMA, urged the establishment of a state licensure process or examination, thereby standardizing licensure to practice medicine ("AMA: History," n.d.). Over the next decade, Dr. William Osler championed a curriculum including a medical clerkship that engaged meaningful, face-to-face interactions between students and patients. Johns Hopkins Medical School embraced Osler's approach to medical education, which resulted in Johns Hopkins establishing a reputation as the exemplary medical school in the nation (Ludmerer, 2004).

A second seminal event in the history of medical education in the United States is the Flexner Report. In 1908, William Flexner initiated a study lasting two years; in 1910, he reported the findings to the Carnegie Foundation for the Advancement of Teaching in a document entitled "Medical Education in the United States and Canada," commonly referred to as the Flexner Report. Flexner surveyed all 155 medical education institutions in the United States and Canada that granted M.D. or D.O. degrees. The report concluded that the state of medical education was inadequate, too many institutions were offering substandard education, and free-standing medical institutions could not produce the funding necessary to develop and

maintain high-quality educational opportunities for students. From this study, Flexner made several suggestions, the most significant of which included these points:

- Schools should have minimum admission requirements: a high school education and at least two years of college level or university science.
- Medical school should be four years in duration with two years of basic science and two years of clinical experience.
- "Proprietary" schools should be closed or incorporated into universities.

Flexner based many of his recommendations on the German model of medical education which required two years of basic sciences followed by two years of clinical experience (Flexner, 1910b).

In the 25 years following the publication of the Flexner Report, 89 of the original 155 medical schools surveyed for the report closed their doors (Schuler, 2006). Additionally, following the report, both the utilization of basic sciences and laboratory courses and the requirements for students entering medical school increased. By 1929, all medical programs required at least two years of college education prior to admittance (Barzansky & Gevitz, 1992).

The Flexner Report defined the modern medical education establishment. The model, however, resulted in the need for significant philanthropy to support academician salaries, in order to allow physicians to focus significant time on clinical teaching as opposed to clinical fee generation from patient care (Duffy, 2011). Flexner's report decimated the remaining privatized medical school reputations and pedagogy, effectively ending the apprenticeship model in medical education (Cooke, Irby, Sullivan, & Ludmerer, 2006).

In the late 19th century, the first formal residency programs were established by Sir William Osler and William Stewart Halsted at the Johns Hopkins Hospital (Evans & Fargason,

1996). The Johns Hopkins model built upon the German model of medical education emphasizing scientific study, research, and patient interaction which evolved into the Hopkins model of education emphasizing patient care, teaching, and research (Hellman, 2010). In order to accomplish the model, Johns Hopkins needed to establish an academic health center (AHC) which incorporated the scholarly activity of medical school with the rigorous bedside training of hospital experience. Thus, Johns Hopkins Hospital evolved into the Johns Hopkins Medical Center and developed into the premier medical education facility in the United States.

A resident physician, or resident, is a graduate of an accredited medical school and holds a medical degree. The name "resident" is derived from the fact that the medical trainees used to literally reside in the hospital, providing continual care for the ill and infirm. They became known as the "house staff" of the hospital simply because they spent a significant portion of their time "in house" or in the hospital (Santiago, n.d.). This portion of medical education became known as graduate medical education, as the training for those who have completed medical school and are beginning training in an area of specialization.

A residency program is a period of education in a chosen specialty that physicians undergo after they graduate from medical school. Most residency programs last from three to seven years, during which time residents care for patients under the supervision of a physician faculty member and participate in educational and research activities. When physicians graduate from a residency program, they are eligible to take their board certification examinations and begin practicing independently (Santiago, n.d.).

As medical education progressed through the 20th century, the need for standardization in residency training began to evolve. Much like the standards for undergraduate medical education were influenced by seminal events such as the creation of Johns Hopkins and the

Flexner Report, graduate medical education had events that shaped its requirements as well. Between 1928 and 1964, groups of gynecologists, surgeons, and internists began to formalize what they felt were the necessary requirements for their training programs (Taradejna, 2007).

In 1981, the Accreditation Council on Graduate Medical Education came into being. Between the periods of 1964 and 1981, various governmental and private institutions made multiple attempts to standardize graduate medical education. The literature shows that each of these attempts eventually collapsed under the weight of its own bureaucracy.

The ACGME, a private, nonprofit council for evaluation and accreditation of residency programs, is the single accrediting body of all post-graduate allopathic medical education programs in the United States. ACGME's mission is to "improve health care by assessing and advancing the quality of resident physicians' education through exemplary accreditation" ("ACGME at a Glance," para. 1, n.d.). In 2010-2011, 8,887 ACGME-accredited residency programs in the United States encompassed 133 specialty and subspecialty training programs for 113,142 full- and part-time residents ("ACGME at a Glance," n.d.).

In order to review and monitor the 133 programs, ACGME has 28 review committees, referred to as the RRC – Residency Review Committees. Members of each committee are appointed by the American Medical Association Council on Medical Education as well as the appropriate specialty board. In addition to the individual RRC for a given specialty, an Institutional Review Committee (IRC) also reviews any institution that sponsors graduate medical education. The IRC members are appointed by ACGME's executive committee and approved by the Board of Directors ("ACGME at a Glance," n.d.).

Each specialty has its own requirements for training and accreditation. All programs accredited by ACGME have a group of common requirements necessary for successful

accreditation (ACGME, 2013). ACGME monitors compliance with these program requirements through various means including site visits, anonymous reporting, and the ACGME Resident-Fellow Survey ("ACGME Resident-Fellow Survey," n.d.). Failure to maintain compliance with these standards can result in a number of penalties, including, but not limited to, a reduction in resident positions granted to the program, suspension of programs, or the complete closure of a program (ACGME, 2011).

Critical Review of Relevant Literature

In an effort to improve patient care, reduce perceived medical errors, and lessen the problem of resident burnout, on July 1, 2003, ACGME implemented a common program requirement limiting the number of duty hours, or work hours, that a resident could work during a seven-day work period. It has been documented over the decades that resident physicians have worked long hours and have little opportunity for sleep. Some reasons why residents have been required to work long hours include the belief that extensive duty hours are "essential to provide residents with the education experiences they need to become competent in diagnosing and treating patients" (Institute of Medicine, para. 1, n.d.). Other justification for residents working excessive hours include the simple tradition that physicians in training should be sleep-deprived, working long and intense hours saving lives and solving medical mysteries. In fact, prior to 2003, it was not uncommon for resident physicians to work as much as 95 to 136 hours out of the 168 hours in a week (Wallack & Chao, 2001).

The ACGME restriction of resident duty hours stemmed from patient care concerns, which were exposed by the death of Libby Zion, an 18-year-old college freshman who presented to New York Hospital (now New York Presbyterian Hospital) on the evening of March 4, 1984, with a high fever and what was described as "jerking" movements. Ms. Zion was admitted for hydration and observation under the assumption that she had a viral syndrome. She was

evaluated by residents who touched base via telephone with the attending physician of record, Dr. Raymond Sherman, who was also Ms. Zion's family physician. Having never physically examined the patient, Dr. Sherman agreed with the residents' plan of care. This communication was documented to have occurred about 3:00 a.m. on March 5, 1984 (Lerner, 2009).

As the night wore on, Ms. Zion became more agitated, and this information was passed to the intern, or first-year resident, who had evaluated Ms. Zion. The intern, who was too occupied with other patients to physically examine Ms. Zion, ordered a sedative and the application of restraints. The second-year, or senior, resident on record, who was to guide and oversee the intern, had left the emergency room to sleep after a long shift. This left the intern alone to manage and treat all patients under the care of the team. At 6:00 a.m. on March 5, 1984, nurses rechecked Ms. Zion's vital signs only to discover a fever of 107 degrees. After significant attempts to lower Ms. Zion's internal body temperature, she ultimately suffered a cardiac arrest and died (Lerner, 2009).

When Sidney and Elsa Zion, Libby's parents, discovered that their daughter, upon presentation to the hospital, had never been physically evaluated by the attending physician, Dr. Sherman, that Libby was never physically re-evaluated when she became agitated, that Dr. Sherman, as the attending physician, never came to the hospital to evaluate the patient, that the physician evaluating her was in training, and that those physicians in training frequently worked 36 hour shifts without rest, Mr. Zion began a crusade to make his daughter's story known (Lerner, 2009).

The malpractice case filed on behalf of Libby Zion went to trial in 1994. However, it was the initial grand jury investigation which chastised New York Hospital for the exhaustive work hours required of resident physicians. The grand jury report led to the formation of a New

York state commission to investigate resident physician work hours and practices of resident supervision. In 1987, the commission recommended that resident physicians in training work no more than 80 hours per week including no more than 24 hours in a row (Lerner, 2009). ACGME adopted the recommendations in 2003, making them mandatory for all residency training programs wishing to maintain their accreditation.

The ACGME Common Program Requirements state that resident duty hours must be limited to 80 hours per week, averaged over a four-week period, inclusive of all in-house call activities. There are limited allowable exceptions to the rule; for example, a review committee may grant an exception for a maximum of 88 hours of work per week if the request is based on sound educational rationale. Residents must be provided with one day in seven free from all educational and clinical responsibilities, averaged over a four-week period, inclusive of call responsibilities. ACGME has limited the maximum duty length, consisting of both in-house duty and in-house call, to 24 consecutive hours; however, residents may remain on duty for up to six additional hours to participate in didactic activities, transfer patient care, conduct outpatient clinics, and maintain continuity of care. Under no circumstances may new patients be accepted after 24 hours of continuous duty (ACGME, 2013).

Moonlighting was also addressed by ACGME. Moonlighting is commonly defined as any activity outside the educational requirements of a program in which a resident physician performs duties as an independent practitioner and receives financial remuneration for those services. The 2003 ACGME duty hour guidelines state that moonlighting activities must not interfere with the educational goals of the program. Additionally, any internal moonlighting must be considered as part of the ACGME 80-hour work week limit on duty hours (ACGME, 2013).

Time off away from education and training is also regulated. Programs are required to allow adequate time for rest and personal activities, defined as a 10-hour time period between daily duty periods and after in-house call. Additionally, the responsibility of in-house call can happen not more than every third night, averaged over a four-week period. When residents are called to the hospital, any hours spent must be counted toward the 80-hour work limit (ACGME, 2013).

Several studies after the 2003 ACGME duty-hour limit went into effect showed modest decreases in burnout, but evidence linking burnout to work hours has been mixed. A 2013 study showed that working with at least 24 hours of overnight call was associated with higher burnout and fatigue scores. However, adherence to the 2003 ACGME work-hour requirements (including the 80-hour work- week, departure on time at the end of shifts, and number of days off in the previous month) was not associated with lower burnout scores (Block, Wu, Feldman, Yeh, & Desai, 2013). Likewise, Fletcher, Reed and Arora reviewed 60 studies as they related to the work hour rule implementation and patient outcomes as well as resident satisfaction and burnout. They found that resident well-being and satisfaction tended to increase after implementation of the work hours rule, but only by a negligible margin (Fletcher, Reed & Arora, 2011). Gopal, Glasheen, Miyoshi, and Prochazka (2005) reported similar findings that burnout continued to be a major problem after the work hour rule implementation. They concluded that reducing hours may be the first step to reducing burnout, but the reduction in hours may also affect education and quality of care.

On July 1, 2011, the second set of duty hour regulations took effect. The 2011 work hour rules built upon the original 2003 duty hour restrictions but added a noted focus on intern, or first year, resident work hours. The so called "16 hour rule" implemented for interns specifically

states, “duty periods of PGY-1 (intern) residents must not exceed 16 hours in duration” (ACGME, 2013). Furthermore, ACGME noted more specific work hour rules for more senior residents. Table 1 provides a brief comparison of the relevant 2003 and 2011 ACGME duty hour regulations (ACGME Duty, n.d.).

Table 1

Partial Comparison of 2003 and 2011 Duty Hours

	2003	2011
Maximum Hours of Resident Work per Week	Hours must be limited to 80 per week, averaged over a four-week period, inclusive of all in-house call activities	Hours must be limited to 80 hours per week, averaged over a four-week period, inclusive of all in-house call activities *and all moonlighting*.
Moonlighting	Internal Moonlighting must be considered part of the 80-hour weekly limit on duty hours	Time spent in Internal and *External* Moonlighting must be counted towards the 80-hour work week. *Interns are not permitted to moonlight.*
Mandatory Time Off	Residents must have one day in seven free from all educational and clinical responsibilities, averaged over a four-week period, inclusive of call.	Residents must have one day in seven free from all duty every week, averaged over a four-week period. *At-home call cannot be assigned on these days.* *Interns must not exceed 16 hours in shift length.*
Maximum Shift Length	Resident shift length must not exceed 30 hours (24 consecutive work hours with six hours for transition of care and educational activities). No new patients after 24 hours of continuous care.	Second Year Residents and above must *not exceed 24 consecutive work hours with not more than 4 hours* for transition of care and educational activities.
Minimum Time Off Between Duty Periods	Adequate time for rest and personal activities must be provided. This should consist of a 10-hour time period between daily duty hours and after in-house call.	Intern Residents should have 10 hours, *and must have eight hours*, free of duty between scheduled duty periods. Second Year Residents and

		above should have 10 hours free of duty, *and must have eight hours* between scheduled duty periods. *They must have at least 14 hours free of duty after 24 hours of in-house duty*.
Night Float	No Defined Rules	*Residents must not be scheduled for more than six consecutive nights of night float.*
Alertness and Fatigue	Faculty and residents must be educated to recognize signs of fatigue and sleep deprivation and must adopt and apply policies to prevent potential negative effects on learning and patient care.	The program must educate all faculty and residents to recognize the signs of fatigue and sleep deprivation. *The sponsoring institution must provide adequate sleep facilities and/or safe transportation options for residents who may be too fatigued to safely travel home.*

A review of the literature as it relates to the effects of the 2011 work hour regulations reveals scant, and often conflicting, results. Shea et al. (2014) surveyed internal medicine (*n*=287) and surgery (*n*=118) program directors before implementation of the 2011 work hour rules, examining what the directors believed the anticipated consequences of the 2011 duty hour restrictions on intern residents would be. The program directors were asked what they felt the likely impact of the 2011 regulations would be on the intern learning environment, workload, educational opportunities, program administration, and patient outcomes. The study concluded that both internal medicine and surgery program directors felt the intern clinical experience would be adversely affected. Both groups felt the new regulations would likely negatively impact the intern learning experience and intern resident well-being, including resident-to-resident relationships.

Similarly, Drolet, Whittle, Khokhar, Fischer, and Pallant (2013) summarized research they had performed of pediatric program directors and their opinion and perception of the 2011 duty hour reforms. They concluded that the program directors perceived numerous negative impacts of the 2011 duty hour restrictions on intern residents, feeling that education, resident accountability, and patient care had all suffered from the restricted hours placed on intern residents.

While the literature reveals a general negative perception of the 2011 duty hours by faculty and directors, literature as it relates to resident responses to the 2011 duty hour rules presents conflicting conclusions. Theobald et al. (2013) addressed the concerns of limited educational opportunities for interns as a result of a reduction to 16 hour shifts. They examined educational experiences of two cohorts of intern residents for years 2010 (n=47) and 2011 (n=50), reviewing inpatient encounters, breadth of intern notes, presentation of patient problems, procedural experience, and attendance at teaching conferences. Their research concluded that educational exposure to patients did not significantly decrease after the implementation of the 16-hour shift reduction. Their study noted that interns had more face-to-face patient encounters, produced more detailed encounter notes, and attended more educational conferences following the duty hour limitations.

Increased resident well-being, or self-perceived satisfaction, is referred to as one of the stated goals of the 2011 work hour rules. In 2013, JAMA Internal Medicine published the results of a longitudinal study investigating the effects of the 2011 work hour rules on intern hours of rest (sleep), personal well-being, depressive symptoms, and self-perceived medical errors. The authors surveyed a group of interns at 14 ACGME accredited institutions (n=2323) at three-, six-, nine-, and 12-month intervals during their intern year. The result of the study revealed that

while interns worked fewer hours under the 2011 work hour rules, no correlation existed with their increased rest or sleep. Furthermore, neither a significant increase in intern self-perceived well-being nor a significant decrease in self-perceived depressive symptoms occurred. The study also revealed a surprising increase in intern self-perceived medical errors (Sen et al., 2013). The results of the study are in direct conflict with a portion of the reported goals of the 2011 work hour rules.

The literature as it relates to the 2011 work hour rules tends to focus on the program director and/or intern perception of the rules and their effect, if any, on the intern experience. In 2012, the *New England Journal of Medicine* published a study which included 1316 resident respondents across all disciplines and years. The study revealed that 61.8% of interns experienced an increased quality of life as opposed to interns in previous years. However, senior residents reported a decreased quality of life as well as declining satisfaction with work schedules. The authors hypothesized the negative effect on senior resident perceptions was a direct result of the reduction in intern hours, which required the senior residents to absorb more clinical time. Like other literature reviewed, this study corroborated other results that residents overall did not feel their amount of rest had changed as a result of the 2011 work hour rules (Drolet, Christopher, & Fischer, 2012).

According to ACGME, the Resident-Fellow Survey was developed as an additional means to monitor resident programs and their compliance with ACGME standards. Prior to 2013, a single questionnaire was provided to residents. Beginning with 2013, no single survey is administered; rather, ACGME makes use of a database of program-related questions that are administered at random. All residents in U.S.-based, ACGME-accredited programs are provided with the survey between January and June of each year. Programs with four or more residents

and a response rate of 70% or greater are provided with their questionnaire results in aggregate to allow for anonymity ("ACGME Resident Fellow Survey," n.d.).

Beginning with the 2012-2013 academic year, the survey is now accompanied by a publication informing residents that all data will be saved anonymously. Any data supplied to the program or institution will be summarized with no identifying factors. Residents and fellows are advised that the survey takes approximately 20 minutes to complete and are given a list of eight content areas that will be covered by the questionnaire. Those content areas include Duty Hours, Faculty, Evaluation, Educational Content, Resources, Patient Safety, Teamwork, and Overall Program Satisfaction. The survey contains a significant focus on duty hours and resident fatigue. ACGME supplies residents with a "Duty Hour Question Guide" to clarify terms such as "duty hours," "in house call," and "adequate time for rest" so as to avoid misinterpretation of questions ("ACGME Resident Fellow Survey," n.d.).

The ACGME analyzes the results of the Resident Survey for annual residency program assessment ("ACGME resident fellow survey," n.d.). The resident evaluation of the program is considered to be a vital source of information regarding program quality. The results of the survey are useful for both the sponsoring institution and the program director for planning program evaluation and overall improvement of educational processes in the program (Heard, O'Sullivan, Smith, Harper & Schexnayder, 2004).

The results of the survey and the residents' views tend to be corroborated by others in the graduate medical education environment. Likewise, Yudkowsky, Elliott, and Schwartz (2002) found that both residents and program directors agreed on the factors necessary to maintain a successful graduate medical education training program. They include a challenging curriculum

supported by strong clinical resources as well as significant institutional and departmental support.

While the data are limited to residents' opinions, the data collected have been found to be highly predictive of RRC accreditation actions (Holt, Miller, Philibert, Heard, & Nasca, 2010). Generally, RRCs use the survey results during program review only after the findings have been verified by a site visit (Philibert, Miller, Heard, & Holt, 2009). Hence, survey results which have statistically significant variances from the norms on the ACGME resident survey can be predictive not only of a site survey, but also of punitive actions by the RRC.

While the ACGME resident survey is a highly regarded tool, utilized by both the ACGME and institutions alike to assess resident opinions of their programs, some studies have questioned the validity of the ACGME survey. Based on the increased importance of the resident survey and the potential negative impact a less than favorable resident survey could have on a program, Fahy et al. developed their own in-house survey and compared results to the ACGME survey. Of the questions compared, the in-house survey results were more favorable than the ACGME survey. The study concluded that the ACGME survey may inaccurately reflect program non-compliance (Fahy et al., 2010).

Residents are employed by the sponsoring ACGME institution, and their perceived job satisfaction is a significant portion of the survey. Job satisfaction has been defined as the difference between what a worker experiences in, workplace and what she or she wants or expects in the workplace (Berry, 1997). Employers can retain qualified employees and eliminate the costs associated with absenteeism, employee turnover and repeat hiring through increased employee job satisfaction (Syptak, Marsland, & Ulmer, 1999).

Residents' evaluations of their programs are considered to be predictors of resident job satisfaction (Holt et al., 2010). A 2008 study concluded that residents' evaluations of their work environments are related to their perceptions of the quality of patient care they provide (Davenport, Henderson, Hogan, Mentzer, & Zwischenberger, 2008). Furthermore, the importance of resident satisfaction is a significant component of resident perceived "burnout" thought to be responsible for significantly more self-perceived medical errors (Shanafelt et al., 2002). West et al. (2006) supported the notion that poor resident job satisfaction increased the resident's self-reported perception of sub-par patient care and self-reported medical errors.

Resident job satisfaction has been the topic of numerous studies. A literature review reveals that "burnout" is the term most frequently utilized to correlate with resident job satisfaction. The term "burnout" was coined by Herbert Freudenberger in his article "Staff Burnout" that discussed job dissatisfaction precipitated by work related issues (Freudenberger, 1974). Burnout is described as a state of mental and physical exhaustion related to work activities. *The World Health Organization International Classification of Diseases*, (10^{th} revision) has classified Z73.0 as "burnout" or a "state of vital exhaustion." ("HIPAASpace: ICD-10 Code Lookup," n.d.). Between its initial coining and 2013, the term "burnout" has achieved legitimacy in the common vernacular as well as in the medical establishment.

The Maslach Burnout Inventory (MBI) is the most commonly used measure to determine burnout in research studies. The original MBI was based on burnout being defined as a syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment that can occur among individuals who do 'people work' of some kind. When studying burnout among employees who work with people, the Maslach Burnout Inventory Human Services Survey (MBI HSS) is utilized to review the three scales of emotional exhaustion,

depersonalization, and personal accomplishment (Maslach, Jackson, & Leiter, 1997). The MBI HSS has been utilized for studying burnout in human services professionals exclusively.

Human services professionals, particularly those in graduate medical education, come from a variety of backgrounds, nations, and cultures. A number of studies have questioned the validity of the MBI HSS for those of non-speaking or limited English speaking capability. A review of the literature confirms that the results of these studies corroborate the validity of the MBI HSS across both language and cultural barriers (Kanste, Miettunen, & Kyngas, 2006; Marcelino et al., 2013; Sasaki, Kitaoka-Higashiguchi, Morikawa, & Nakagawa, 2009; Tang, 1998).

The MBI Human Services Survey (MBI HSS) is a self-administered, 22-item questionnaire. Emotional exhaustion is measured by nine items, depersonalization by five items, and personal accomplishment by eight items. All items have a seven-point Likert scale ranging from 0 ("never experienced such a feeling") to 6 ("experience such feelings every day"). Higher scores on the emotional exhaustion and depersonalization subscales indicate higher burnout, whereas higher scores on personal accomplishment indicate lower burnout. Based on data from 1104 medical professionals, burnout is detected using cutoff scores of high emotional exhaustion ($\geq$27), high depersonalization ($\geq$10), and low personal accomplishment ($\leq$33) (Maslach et al., 1997).

Multiple studies have reviewed the burnout rates of resident physicians. A University of Washington study of internal medicine residents found that 76% of residents met criteria for burnout as measured by the MBI. These results noted that the burnout rate was not differentiated by resident year (Martini, Arfken, Churchill, & Balon, 2004). However, another study performed in 2006 showed that 4.3% of internal medicine residents met criteria for burnout at the

beginning of the academic year. By the end of their first year, the burnout rate had increased to 55.3% (Rosen, Gimotty, Shea, & Bellini, 2006). Additional studies by West, Shanafelt, and Kolars (2011) and Ripp, Babyatsky, and Fallar (2011) both confirm that burnout is more prevalent among interns, or first-year residents, regardless of specialty.

West et al. (2011) performed a large, nation-wide, cross-sectional survey among internal medicine residents. Their study, which surveyed 16,394 internal medicine residents of which 8,571 were international medical graduates and 7,743 were U.S. medical graduates, found that burnout is multi-dimensional, containing several confounding factors. The study found significantly lower quality of life, satisfaction with work/life balance and increased burnout for those with debt, specifically those owing more than $200,000. Furthermore, burnout was less common among international medical school graduates, who also reported lower debt loads. The study showed that while burnout decreased as the year of training progressed, depersonalization increased. Additionally, the study showed that residents in primary care programs reported more symptoms of emotional exhaustion and depersonalization (West et al., 2011).

A critical review of the literature as it relates to medical residents and burnout indicates that burnout rates for different medical specialties vary depending on sample size, location, and methods utilized to assess the burnout rates; however, the common factor in all studies reviewed is that burnout exists across all residencies, across both sexes, regardless of age or debt, and regardless of nationality. The only variance is to what degree the burnout rates are assessed.

A well-referenced and highly-regarded study by Martini et al. in 2004 compared burnout rates among resident specialties. The research included mailing the MBI to residents in eight different specialties and yielded a response rate of 35%. The overall rate of residents who met the criteria for burnout was 50% with variation among specialties. Variations among specialties

were as follows: 75% in obstetrics/gynecology, 63% in internal medicine, 63% in neurology, 60% in ophthalmology, 50% in dermatology, 40% in general surgery, 40% in psychiatry, and 27% in family medicine. The study concluded that being an intern resident, being single, citing personal stress, and expressing dissatisfaction with faculty were all associated with burnout (Martini et al., 2004).

Summary

Medical education and graduate medical education have evolved over the last century into highly regulated and monitored institutions. At the beginning of the 20th century, residency was a novel way to train physicians and was by no means mandatory. Today, the United States boasts 8,887 ACGME-accredited residency programs that encompass 133 specialty and subspecialty training programs for 113,142 full- and part-time residents ("ACGME at a Glance," n.d.). The rigor of the requirements to maintain accredited residency programs is well publicized. Part of the rigor for these programs is the need to have satisfied residents training in a positive setting.

In both 2003 and 2011, the ACGME mandated specific regulations for resident duty hours. One of the many stated goals of the duty hour regulations is to increase resident well-being and reduce self-perceived burnout. Results of studies as they relate to the effect of the 2003 rules on resident satisfaction and well-being are mixed. Results of research as it relates to the 2011 rules, which have a strong focus on intern, or first-year, residents, are limited; however, one recent study indicated a significant increase in senior resident dissatisfaction that was hypothesized to be a direct result of fewer work hours for intern residents.

As one of many means to monitor programs and their adherence to ACGME standards, the ACGME initiates a Resident-Fellow Survey each year. The results of the survey have been studied and determined to be highly predictive of an RRC site visit and of punitive actions by the

RRC, as well (Holt et al., 2010). Studies have shown that independent surveys of residents by the sponsoring institution have produced different results which were more complimentary to the program than the RRC-instituted survey (Fahy et al., 2010).

The core items present on the Resident-Fellow Survey include duty hours, faculty, evaluation, educational content, resources, patient safety, teamwork, and overall program satisfaction ("ACGME Resident-Fellow Survey," n.d.). An underlying cause of dissatisfaction in any of these areas might be linked to resident "burnout." Studies have generated mixed results on when burnout begins in training and at what point in training it is most relevant (Martini et al., 2004; Rosen et al., 2006). However, more recent studies indicate that burnout is more prevalent for intern, or first-year, residents. Attempts to identify differences in burnout rates between various specialties have been inconclusive (West et al., 2011; Ripp et al., 2011).

The numerous studies that have attempted to evaluate resident job satisfaction and predict high job satisfaction have arrived at no consistent answer as to what makes residents more or less satisfied. A 2004 article in the *Journal of the American Medical Association* reviewed the literature on resident job satisfaction to determine what factors, if any, tend to increase satisfaction. The review concluded that "aside from working long hours, something about residency seems to leave many residents feeling emotionally exhausted and cynical and leave some depressed and critical of their own patient care performance" (Niku, 2004, p. 2888). What that "something" is has yet to be determined.

CHAPTER 3

RESEARCH METHODS

Purpose of the Study

The purpose of this study is to explore the effect, if any, of the 2003 and 2011 ACGME mandated work hour rule changes on resident self-perceived satisfaction. This chapter introduces the methods utilized to analyze existing data. Data were collected by an independent academic medical center in the United States utilizing its own instrument of measure; the data were provided to the researcher after IRB approval was granted.

Research Design

The research design for this study is cross-sectional, non-experimental, quantitative, and descriptive. This study is classified as cross-sectional as it collects data from across different segments of the population at a particular time. It is non-experimental in that there is no manipulation of the independent variables and no random assignment to groups. Rather, the researcher performed observations and interpretations of previously collected quantitative data. The research was determined to be descriptive as it was conducted to depict people, situations, events, and conditions as they currently exist.

Population

The participants for the study included residents employed at an independent academic medical center in the United States for the years 2002, 2004, 2010, and 2012. Using these criteria, a population of 429 participants was identified, consisting of the following elements: 2002 n=88, 2004 n=100, 2010 n=116, 2012 n=125. The population was further classified by the academic year of the participants.

Data Collection

Data for this survey were collected by the independent academic medical institution between 2002 and 2012 using its own instrument of measure. The data were provided to the researcher after Institutional Review Boards from both the independent academic medical institution and Marshall University determined the study to be exempt from oversight. The study does not involve human subjects as defined in DHHS regulation 45 CFR §45.102(f) and was considered exempt by both institutions (Appendix A and B: Institutional Review Board approvals). The medical institution encouraged the researcher's study of the data.

The data provided by the independent academic medical institution have been collected annually between January and June of each academic year. Each resident employed by the institution was provided the questionnaire regardless of specialty training, year in training, or performance ratings. The survey was provided on paper (Appendix C: Survey Instrument), and residents were encouraged to complete the survey and return it to their resident program office or the institutional graduate medical education office.

The independent academic medical center's questionnaire contained eight sections with three to ten questions in each section. Participants were asked to select their answers from a five-point Likert scale denoting "poor," "fair," "good," "very good," "excellent," and "not applicable." After the implementation of the 2003 resident work hour limitation rules adopted by -ACGME, an additional questionnaire page was added to assess resident work hour requirements. These added questions pertained to the resident perceptions of the institution's adherence to the work hour rules. These questions were designed with yes or no answers, evaluating whether the resident was aware of the work hour rules and whether the resident had received a copy of the work hour rules for the program. Additional questions covered the average number of hours residents worked in a 24-hour period and in a three-day period and questioned

whether they had been granted the necessary rest period as required by the ACGME. Surveys were provided to individual residents; however, information was reported in aggregate without personal identifying information.

Not all data collected were necessary for this study. Only data relevant to the research questions were queried and reviewed. Data files were transferred to SPSS 21 for statistical analysis. Data were analyzed only for purposes of this research.

Data Analysis

This study used descriptive statistics to investigate the characteristics of the data and to answer research questions. The Mann-Whitney U non-parametric test for independent samples was utilized to compare results between groups.

Research Questions

Four research questions guided this study. Each one is identified and discussed below.

1. Is there a significant difference in medical residents' perceived overall program satisfaction as evidenced on the Independent Academic Medical Center's Resident Satisfaction Survey before and after implementation of the 2003 ACGME work hour rules?

To answer this question, a series of survey results were grouped by year, –reviewed, and analyzed. Results were determined by review of the following survey questions for both 2002 and 2004: Program Director – Effectiveness of educational leadership; Resident Input – Extent of resident input in patient care quality assurance; Quality of Life – Your ability to balance residency and personal commitments; Quality of Life – Your ability to participate in family/community activities; Quality of Life – Your ability to function optimally; Satisfaction with Program – Extent to which your educational experience this year will prepare you for your career objectives; Satisfaction with Program – Match of your educational experiences with the

program's stated goals; Satisfaction with Program – Your opportunity to participate in research; Satisfaction with Program – Your role as a member of a team.

The survey questions were reviewed for years 2002 and 2004, and the results were analyzed to identify differences in perceived satisfaction pre- and post-2003 work hour rule implementation.

2. Is there a significant difference in medical residents' perceived overall program satisfaction as evidenced on the Independent Academic Medical Center's Resident Satisfaction Survey before and after implementation of the 2011 ACGME work hour rules?

The answer to this question was derived by review and analysis of survey questions for years 2010 and 2012. Results were determined by examination of the following survey questions: Program Director – Effectiveness of educational leadership; Resident Input – Extent of resident input in patient care quality assurance; Quality of Life – Your ability to balance residency and personal commitments; Quality of Life – Your ability to participate in family/community activities; Quality of Life – Your ability to function optimally; Satisfaction with Program – Extent to which your educational experience this year will prepare you for your career objectives; Satisfaction with Program – Match of your educational experiences with the program's stated goals; Satisfaction with Program – Your opportunity to participate in research; Satisfaction with Program – Your role as a member of a team.

The 2010 and 2012 surveys included two additional quality of life questions based on a three-point Likert scale. Question one stated, "Within the past four work weeks, how would you best describe your level of fatigue as a result of your assigned responsibilities from your residency program?" Available answers were "Lower than usual," "About the same as usual,"

and “More than usual.” Question two stated, “Overall, how would you describe your level of stress and fatigue?” Available answers were “Minimal,” “Average,” and “Excessive.”

Survey answers were compiled by year and analyzed to identify significant variance between years.

3. Is there a significant difference in medical residents’ perceived overall program satisfaction as evidenced in the Independent Academic Medical Center’s Resident Satisfaction Survey pre- and post-Work Hour Rule implementation for years 2002 and 2012?

This question was analyzed by reviewing the following questions from years 2002 and 2012: in other words, from before the implementation of any work hour rules and after the implementation of both the 2003 and 2011 rules. Specific questions regarding work hour rules do not apply to this question since they were not mandatory until the 2003 year. Questions reviewed were: Program Director – Effectiveness of educational leadership; Resident Input – Extent of resident input in patient care quality assurance; Quality of Life – Your ability to balance residency and personal commitments; Quality of Life – Your ability to participate in family/community activities; Quality of Life – Your ability to function optimally; Satisfaction with Program – Extent to which your educational experience this year will prepare you for your career objectives; Satisfaction with Program – Match of your educational experiences with the program’s stated goals; Satisfaction with Program – Your opportunity to participate in research; Satisfaction with Program – Your role as a member of a team.

Survey answers were analyzed to identify significant variance between years 2002 and 2012.

4. Is there a significant difference in First-Year/Intern residents' perceived overall program satisfaction as evidenced in the Independent Academic Medical Center's Resident Satisfaction Survey for pre- and post-Work Hour Rule implementation of 2011?

As noted in Chapter 2, the 2011 iteration of ACGME work hour rules had a particular focus on intern, or first-year resident, duty hours. To answer this question, the researcher analyzed the following questions for intern, or first-year, resident responses only: Program Director – Effectiveness of educational leadership; Resident Input – Extent of resident input in patient care quality assurance; Quality of Life – Your ability to balance residency and personal commitments; Quality of Life – Your ability to participate in family/community activities; Quality of Life – Your ability to function optimally; Satisfaction with Program – Extent to which your educational experience this year will prepare you for your career objectives; Satisfaction with Program – Match of your educational experiences with the program's stated goals; Satisfaction with Program – Your opportunity to participate in research; Satisfaction with Program – Your role as a member of a team.

Additionally, the work hour rule and quality of life questions noted in Research Question 2 were analyzed. These data were analyzed for any significant variation between the years as it relates to the intern experience.

Summary

This study of residents' perceived satisfaction with their program along with the program's adherence to ACGME mandated work hour rules and what effect, if any, this limitation of work hours has on resident well-being used a non-experimental, causal comparative design. Data were collected from an independent academic medical center in the United States using its own instrument of measure.

Data were analyzed using relevant questions from the survey instrument for each of the four research questions to determine the effectiveness of the work hour rules in improving the experience of medical residency. Findings from this study will contribute to the body of knowledge regarding ACGME mandated work hour rules in both 2003 and 2011 and what effect, if any, those changes had on resident self-reported satisfaction.

CHAPTER 4

DATA ANALYSIS AND RESULTS

The purpose of this study was to explore how residents perceive their residency programs' compliance with the ACGME Common Program Requirements, specifically the section devoted to resident satisfaction and work hours. The study examined any variation in these perceptions as they relate to both the 2003 and 2011 work hour rule changes. The study evaluated statistically significant variations between resident satisfaction measured both pre- and post-work hour rule implementation in 2003 and 2011. Findings from this study will contribute to the current body of knowledge in residency education and provide insight into perceived resident satisfaction as well as assessing the effects of work hour rules on resident satisfaction at an independent academic medical center.

Data Collection

Data for this survey were collected by the independent academic medical institution between 2002 and 2012 using its own instrument of measure. The data are collected annually between January and June of each academic year. Each resident employed by the institution was provided the questionnaire regardless of specialty training, year in training, or performance ratings. The survey was provided on paper (Appendix C: Survey Instrument), and residents were encouraged to complete the survey and return it to their resident program office or the institutional graduate medical education office.

The independent academic medical center's questionnaire contained eight sections with three to ten questions in each section. Participants were asked to select their answers from a five-point Likert scale denoting "poor," "fair," "good," "very good," "excellent," and "not applicable." After the implementation of the 2003 resident work hour limitation rules adopted by ACGME, an additional questionnaire page was added which focused on assessing resident

work hour requirements. These supplementary questions pertained to the resident perceptions of the institution's adherence to the work hour rules. These questions were designed with yes or no answers, evaluating whether the resident was aware of the work hour rules and whether the resident had received a copy of the work hour rules for the program. Additional questions covered the average number of hours residents worked in a 24-hour period and in a three-day period and asked whether they had been granted the necessary rest period as required by the ACGME. Surveys were provided to individual residents; however, information was reported in aggregate without personal identifying information.

The data were received from the independent academic medical institution in a single Excel spreadsheet with each year's survey results listed under individual tabs noting the year. The final tab of the Excel sheet contained the data dictionary referencing how each answer was coded. Survey question responses for those questions determined useful for this study were copied into a new Excel spreadsheet. Of the data reviewed, none of the respondents indicated "not applicable" to any of the questions.

Research Questions

1. Is there a significant difference in medical residents' perceived overall program satisfaction as evidenced on the Independent Academic Medical Center's Resident Satisfaction Survey before and after implementation of the 2003 ACGME work hour rules?

2. Is there a significant difference in medical residents' perceived overall program satisfaction as evidenced on the Independent Academic Medical Center's Resident Satisfaction Survey before and after implementation of the 2011 ACGME work hour rules?

3. Is there a significant difference in medical residents' perceived overall program satisfaction as evidenced in the Independent Academic Medical Center's Resident Satisfaction Survey pre- and post-Work Hour Rule implementation for years 2002 and 2012?

4. Is there a significant difference in First-Year/Intern residents' perceived overall program satisfaction as evidenced in the Independent Academic Medical Center's Resident Satisfaction Survey for pre- and post-Work Hour Rule implementation of 2011?

Data Analysis

The data were analyzed utilizing IBM SPSS Statistics 21. The Mann-Whitney U non-parametric test for independent samples was utilized to compare results between groups. All analyses contained the dependent variable of resident satisfaction ratings of various questions relating to their residency program and experience. The independent variable was the application of both the 2003 and 2011 ACGME work hour rules.

For each research question, the survey results were grouped by year with the Mann-Whitney U non-parametric test being applied to determine results between the groups, or years.

Research Findings

Research Question 1: Is there a significant difference in medical residents' perceived overall program satisfaction as evidenced on the Independent Academic Medical Center's Resident Satisfaction Survey before and after implementation of the 2003 ACGME work hour rules?

Based on the results of the Mann-Whitney U non-parametric test for independent samples comparing years 2002 and 2004, no significant difference existed in medical residents' perceived overall program satisfaction after implementation of the 2003 ACGME work hour rules. Table 2 below illustrates these results.

Table 2

Mann-Whitney U Analysis Between Years 2002 and 2004

Question	Year 2002 Mean Ranks	Year 2004 Mean Ranks	Mann-Whitney U-Obtained

				p Level
1	**Program Director** – Effectiveness of program leadership	86.46	97.68	.134
2	**Resident Input** – Extent of resident input in patient care quality assurance	86.42	95.86	.203
3	**Quality of Life** – Your ability to balance residency and personal commitments	94.17	92.92	.870
4	**Quality of Life** – Your ability to participate in family/community activities	89.31	97.10	.308
5	**Quality of Life** – Your ability to function optimally	89.68	94.02	.563
6	**Satisfaction with Program** – Extent to which your educational experience this year will prepare you for your career objectives	90.57	96.98	.397
7	**Satisfaction with Program** – Match of your educational experiences with the program's stated goals	89.20	96.37	.339
8	**Satisfaction with Program** – Your opportunity to participate in research	82.04	93.38	.127
9	**Satisfaction with Program** – Your role as a member of the team	93.28	93.69	.956

* Significance attained at $p<.05$

The conclusions drawn from this research are similar to the findings reported by Gopal, Glasheen, Miyoshi, and Prochazka in their 2005 study which indicated that burnout and poor satisfaction continued to be a notable problem post-2003 work hour rule implementation.

Research Question 2: Is there a significant difference in medical residents' perceived overall program satisfaction as evidenced on the Independent Academic Medical Center's Resident Satisfaction Survey before and after implementation of the 2011 ACGME work hour rules?

Based on the results of the Mann-Whitney U non-parametric test for independent samples comparing years 2010 and 2012, -significant difference emerged in medical residents' perceived

overall program satisfaction after implementation of the 2011 ACGME work hour rules. Of the nine questions reviewed, only one, **"**Program Director – Effectiveness of program leadership," indicated a statistically significant difference in satisfaction levels as seen in Table 3 below.

Table 3

Mann-Whitney U Analysis Between Years 2010 and 2012

	Question	Year 2010 Mean Ranks	Year 2012 Mean Ranks	Mann-Whitney U-Obtained *p* Level
1	**Program Director** – Effectiveness of program leadership	110.60	129.61	.016*
2	**Resident Input** – Extent of resident input in patient care quality assurance	110.91	121.87	.194
3	**Quality of Life** – Your ability to balance residency and personal commitments	114.64	125.98	.187
4	**Quality of Life** – Your ability to participate in family/community activities	112.13	127.30	.078
5	**Quality of Life** – Your ability to function optimally	114.60	125.09	.219
6	**Satisfaction with Program** – Extent to which your educational experience this year will prepare you for your career objectives	118.24	123.56	.526
7	**Satisfaction with Program** – Match of your educational experiences with the program's stated goals	117.69	124.07	.451
8	**Satisfaction with Program** – Your opportunity to participate in research	114.19	122.46	.330
9	**Satisfaction with Program** – Your role as a member of the team	119.41	122.48	.715
10	**Fatigue** - Within the past 4 work weeks, how would you best describe your level of fatigue as a result of your assigned responsibilities from your residency program?	124.87	117.41	.258

11	**Fatigue** - Overall, how would you describe your level of stress and fatigue?	120.91	121.08	.978

* Significance attained at $p<.05$

A review of data compiled for question 1"Program Director – Effectiveness of program leadership" indicates the significant finding was more favorable for the 2012 results as opposed to the 2010.

It is interesting to note that the literature reviewed regarding the 2011 work hour rules reveals a general negative perception of the increased work hour limitations by program directors. Both Shea et al. (2014) and Drolet et al. (2013) concluded that program directors perceived numerous negative impacts of the ability to manage their respective programs without limiting education, resident accountability, patient care, and program administration. The results of the current research are in direct conflict with the program directors perceptions of what was likely to happen as a result of the 2011 work hour rule implementation. The 2012 resident group found their program directors to exhibit more effective program leadership than those prior to the 2011 work hour rule implementation.

Research Question 3: Is there a significant difference in medical residents' perceived overall program satisfaction as evidenced in the Independent Academic Medical Center's Resident Satisfaction Survey pre- and post-Work Hour Rule implementation for years 2002 and 2012?

The Mann-Whitney U non-parametric test for independent samples shows a statistically significant variance of all nine questions reviewed for the study. The group for 2002 was surveyed before the mandatory implementation of the 2003 ACGME work hour rules. Conversely, the 2012 group was surveyed after both the 2003 and 2011 mandated ACGME work hour rules. Table 4 below illustrates the results of the non-parametric test.

Table 4

Mann-Whitney U Analysis Between Years 2002 and 2012

	Question	Year 2002 Mean Ranks	Year 2012 Mean Ranks	Mann-Whitney U-Obtained *p* Level
1	**Program Director** – Effectiveness of program leadership	82.01	121.47	.000*
2	**Resident Input** – Extent of resident input in patient care quality assurance	85.57	112.84	.001*
3	**Quality of Life** – Your ability to balance residency and personal commitments	89.83	116.37	.001*
4	**Quality of Life** – Your ability to participate in family/community activities	88.01	117.63	.000*
5	**Quality of Life** – Your ability to function optimally	86.85	116.70	.000*
6	**Satisfaction with Program** – Extent to which your educational experience this year will prepare you for your career objectives	85.41	121.18	.000*
7	**Satisfaction with Program** – Match of your educational experiences with the program's stated goals	86.50	120.42	.000*
8	**Satisfaction with Program** – Your opportunity to participate in research	75.06	122.69	.000*
9	**Satisfaction with Program** – Your role as a member of the team	90.93	117.34	.001*

* Significance attained at $p<.05$

A review of the results of the non-parametric test reveals that all nine of the questions posed had more favorable self-perceived satisfaction ratings for the 2012 group as opposed to the 2002 group.

The conclusions drawn from this research are supported by the Fletcher et al. study (2011) which indicated a slight increase in resident satisfaction post-implementation of the 2003

work hour rules. A study by Drolet et al. (2012) noted an increase in intern satisfaction post-2011 work hour rules that supports a portion of the findings of this research.

Research Question 4: Is there a significant difference in First-Year/Intern residents' perceived overall program satisfaction as evidenced in the Independent Academic Medical Center's Resident Satisfaction Survey for pre-and post-Work Hour Rule implementation of 2011?

Based upon the results of the Mann-Whitney U non-parametric test for independent samples comparing first-year, or intern, residents' perceived overall program satisfaction before and after the implementation of the 2011 ACGME work hour rules, no significant difference exists in their perceived overall program satisfaction. Table 5 below illustrates these results.

Table 5

Mann-Whitney U Analysis Between First Year/Intern Residents, Years 2010 and 2012

	Question	Year 2010 Intern Mean Ranks	Year 2012 Intern Mean Ranks	Mann-Whitney U-Obtained *p* Level
1	**Program Director** – Effectiveness of program leadership	37.17	40.78	.411
2	**Resident Input** – Extent of resident input in patient care quality assurance	37.37	36.60	.871
3	**Quality of Life** – Your ability to balance residency and personal commitments	40.69	38.81	.628
4	**Quality of Life** – Your ability to participate in family/community activities	32.28	39.71	.772
5	**Quality of Life** – Your ability to function optimally	38.99	40.01	.834
6	**Satisfaction with Program** – Extent to which your educational experience this year will prepare you for your career objectives	40.14	38.86	.791
7	**Satisfaction with Program** – Match of your	40.79	38.21	.594

	educational experiences with the program's stated goals			
8	**Satisfaction with Program** – Your opportunity to participate in research	35.86	38.11	.637
9	**Satisfaction with Program** – Your role as a member of the team	39.19	39.81	.898
10	**Fatigue** - Within the past four work weeks, how would you best describe your level of fatigue as a result of your assigned responsibilities from your residency program?	41.68	37.32	.258
11	**Fatigue** - Overall, how would you describe your level of stress and fatigue?	40.45	38.55	.555

* Significance attained at $p<.05$

The results of this research are supported by Sen et al. (2013) who surveyed intern residents at 14 ACGME institutions (n=2323) at three-, six-, nine- and 12-month intervals during their intern year immediately following the 2011 work hour rule implementation. Sen et al. concluded that while interns had worked fewer hours, no significant increase had occurred in intern self-perceived well-being, or satisfaction.

Summary

Utilizing data supplied by an independent academic medical center, this study was able to clearly identify that both the 2003 and 2011 work hour rules had no immediate effect on resident self-perceived satisfaction. A review of results pre- and post-2003 shows no statistically significant effect on self-perceived satisfaction. Results for data pre- and post-2011 work hour rule implementation reveals only a single area of increased satisfaction with program director leadership. Furthermore, a review of first-year, or intern, resident responses before and after the 2011 work hour rule, which concentrated on intern resident work hours, shows no significant increase in first-year, or intern, resident satisfaction.

Conversely, a comparison of the 2002 and 2012 resident responses indicates a statistically significant increase in overall self-perceived resident satisfaction in all nine of the measured questions. It is possible to suggest that the implementation of resident work hour rules does have a positive effect on self-perceived satisfaction. The data suggest this positive impact is not immediate. Further research as to specific causes of increased self-perceived satisfaction is necessary to determine if the increase in overall scores is a direct result of work hour rules or another variable not identified.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Summary of Purpose

This study examined data collected by an independent academic medical center to explore how residents perceive their residency programs' compliance with the ACGME Common Program Requirements, specifically the section devoted to resident satisfaction and work hours. The study examined the data to detect any variation in these perceptions as they relate to both the 2003 and 2011 work hour rule changes. Significant time and resources are spent by residency programs on adherence to the work hour rules; therefore, it is important to understand whether the rules in place are having a positive effect on the residents' satisfaction with their program and training. Findings from this study will contribute to the current body of knowledge in residency education and provide insight into perceived resident satisfaction as well as assess the effects of work hour rules on resident satisfaction at an independent academic medical center.

The following questions defined the nature of the research:

1. Did the implementation of the ACGME mandated work hour rules of 2003 have a statistically significant impact on residents' self-perceived satisfaction with their program?

2. Did the implementation of the more stringent ACGME work hour rules of 2011 have a statistically significant impact on residents' self-perceived satisfaction with their program?

Summary of Procedures

Data for this study were collected from an independent academic medical center in the United States in the form of an Excel file with spreadsheets dedicated to the academic years spanning 2002-2013. The data were collected and coded by the academic medical center and

provided to the researcher with all individually identifiable information removed. The data file contained a final tab which served as a key to the coding utilized by the institution. Not all data collected were necessary for this study. Only data relevant to the research questions were queried, transferred to a new Excel file, and reviewed. Data files were then transferred to SPSS 21 for statistical analysis. Data were analyzed only for purposes of this research.

In analyzing and testing the data, descriptive statistics were used to investigate the characteristics of the data and to answer research questions. The Mann-Whitney U non-parametric test for independent samples was utilized to compare results between groups.

Summary of the Findings

The population for this study was a total of 429 medical residents in training at an ACGME accredited academic medical institution in the United States for years 2002, 2004, 2010 and 2012. The population spanned all levels of residents from first year to senior. The total sample size (*n*) was 429, consisting of the following: for 2002, *n*=88; for 2004, *n*=100; for 2010, *n*=116; and for 2012, *n*=125.

Little to no statistically significant difference in residents' self-perceived satisfaction existed after implementation of either the 2003 or 2011 ACGME mandated work hour rules, as measured one year before and after implementation. Likewise, a review of data for intern, or first-year, residents, pre- and post-implementation of the 2011 ACGME work hour rules, indicated no immediate change in intern self-perceived satisfaction.

However, a statistically significant increase in resident self-perceived satisfaction emerged between the years 2002 and 2012. The 2002 sample was surveyed before the ACGME mandated work hour rules, whereas the 2012 sample was surveyed after the implementation of both the 2003 and 2011 work hour rules. This findings show that resident satisfaction did

improve after implementation of the ACGME rules, even though the improvement was not immediate.

The data analysis indicated that resident physicians in 2012 were more satisfied with their program director's leadership as well as their input in patient care quality assurance after implementation of both work hour rules than they were before either rule (in 2002). Furthermore, the three measures of "quality of life"—the ability to balance residency and personal commitments, the ability to participate in family/community activities, and the extent to which the residents' educational experiences prepare them for their career objectives—all showed a statistically significant rise in self-perceived satisfaction. Finally, the three measures of "satisfaction with program" all showed increases between 2002 and 2012. These measures included the match of one's experiences with the program's stated goals, the ability to participate in research, and the resident's perceived role as a member of a team.

These results validate ACGME's assertion that limitations on work hours result in more satisfied residents. The results also suggest that the positive impacts of the work hour rules were not immediate; rather, the positive change in self-perceived satisfaction occurred gradually over a period of 10 years.

Limitations

Limitations to this study exist which could have an effect on the generalizability of the results.

First, the survey captured a limited point in time during residency training. Depending on the resident's experiences and overall wellbeing at the time of the response, the individual's perception of satisfaction could vary.

Second, the quality of the data is dependent on the respondents' personal definition of satisfaction and/or fatigue as well as other descriptive terms utilized in the survey.

Third, the data were acquired utilizing a survey instrument developed internally by the independent academic medical center. Additionally, the instrument was applied at the single academic medical center and may not reflect perceptions of residents in other ACGME accredited programs.

Recommendations for Further Research

The topic of resident work hours as well as resident self-perceived satisfaction has been the subject of much debate. This research focused on a single independent academic medical center in the United States for years 2002, 2004, 2010, and 2012. While this research revealed a statistically significant increase in resident self-perceived satisfaction over a period of 10 years, additional research is needed to determine what causes increases in satisfaction and how the intervention can be implemented without compromising the educational objectives of residency.

A review of similar data of other independent academic medical centers would be beneficial. While other institutions may be dissimilar in geography and size, the ACGME mandated work hour rules as well as the ACGME goals to increase resident well-being are applicable to all ACGME residency programs in the United States. The results could lead to a clearer understanding of what increases resident self-perceived satisfaction.

Furthermore, additional research reviewing specific residency program results could reveal whether any particular groups of residents (family medicine, internal medicine, surgery, etc.) are more satisfied than others. Should certain groups be identified as having greater satisfaction, a more in-depth review of work hour management could be conducted to determine if any process or procedure could be uniformly implemented across all residency programs to increase self-perceived satisfaction.

Lastly, the collection of information regarding the locations or rotations of residents at the time of participation in any further research may reveal interesting results. The rigors of the

rotation might have the ability to influence participant results. For example, a resident on ambulatory with no call could conceivably be under a less stressful workload than a resident in the Intensive Care Unit post-call.

Conclusion

In both 2003 and 2011, the ACGME imposed mandated work hour limits on residents, partly with the objective of increasing residents' self-perceived satisfaction during training to become board-eligible or board-certified physicians. The difficulties of implementing these work hour changes while maintaining quality educational experiences are well chronicled in the literature; however, it was not clear whether these changes had any effect on resident self-perceived satisfaction.

Based on the findings of this research, no statistically significant change existed in resident self-perceived satisfaction immediately after implementation of the 2003 or 2011 work hour rules. Furthermore, the 2011 work hour rules, which reduced intern, or first-year, resident work hours over-and-above more senior residents, had no immediate impact on intern residents. However, a comparison between residents from 2002 and 2012 revealed a statistically significant increase in resident self-perceived satisfaction.

If the ACGME is to continue to value medical residents who consider themselves satisfied with their life, career, and training, then a further examination of what specific factors can lead to a medical resident who is both physically and mentally healthy, while having the opportunity to experience quality training, is imperative.

REFERENCES

Accreditation Council for Graduate Medical Education. (n.d.). ACGME duty hours. Retrieved from http://www.acgme.org/acgmeweb/tabid/271/GraduateMedicalEducation/DutyHours.aspx

Accreditation Council for Graduate Medical Education. (2011, June). Policies and procedures manual. Retrieved from http://www.acgme.org/acgmeweb/Portals/0/PDFs/ab_ ACGMEPoliciesProcedures.pdf

Accreditation Council for Graduate Medical Education. (n.d.). ACGME at a glance. Retrieved from http://www.acgme.org/acgmeweb/tabid/120/About/ACGMEataGlance.aspx

Accreditation Council for Graduate Medical Education (2013). ACGME common program requirements. Retrieved from http://www.acgme.org/acgmeweb/Portals/0/PFAssets/ Program Requirements/CPRs2013.pdf

Accreditation Council for Graduate Medical Education. (n.d.). ACGME Resident Fellow Survey Retrieved from http://www.acgme.org/acgmeweb/tabid/97/DataCollectionSystems/ ResidentFellowSurvey.aspx

American Medical Association. (n.d.). The founding of the AMA. Retrieved from http://www.ama-assn.org/ama/pub/about-ama/our-history/the-founding-of-ama.page

American Medical Association. (n.d.). History Timeline. Retrieved from http://www.ama-assn.org//ama/pub/about-ama/our-history/ama-history-timeline.page

Barzansky, B., & Gevitz, N. (1992). *Beyond Flexner: Medical education in the twentieth century*. Westport, CT: Greenwood Press.

Berry, L. M. (1997). *Psychology at work.* San Francisco, CA: McGraw Hill.

Block, L., Wu, A.W., Feldman, L., Yeh, H.C., & Desai, S.V. (2013). Residency schedule, burnout and patient care among first-year residents. *Postgraduate Medical Journal, 89*, 495-500. doi:10.1136/postgradmedj-2012-131743

Cooke, M., Irby, D.M., Sullivan, W., & Ludmerer, K.M (2006). American medical education 100 years after the Flexner Report. *The New England Journal of Medicine, 355*(13), 1339-1344. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/17005951

Davenport, D.L., Henderson, W.G., Hogan, S., Mentzer, R.M., & Zwischenberger, J.B. (2008). Participants in the working conditions of surgery residents and quality of care study: Surgery resident working conditions and job satisfaction. *Surgery, 144*, 332-338.

Drolet, B., Christopher, D., & Fischer, S. (2012). Residents' response to duty-hour regulations:

A follow-up national survey. *New England Journal of Medicine, 366*(24). doi: 10.1056/NEJMp1202848

Drolet, B., Whittle, S., Khokhar, M., Fischer, S., & Pallant, A. (2013). Approval and perceived impact of duty hour regulations: Survey of pediatric program directors. *Pediatrics, 132*(5), 819-24. doi: 10.1542/peds.2013-1045

Duffy, T. P. (2011). The Flexner Report – 100 years later. *Yale Journal of Biology and Medicine, 84*(3). Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3178858/

Evans, H., & Fargason, C. (1996). Medical universities and academic health centers: Lessons of history. *Academic Medicine, 71*(11), 1141-1143.

Fahy, B.N., Todd, S.R., & Paukert, J.L. (2010). How accurate is the Accreditation Council for Graduate Medical Education (ACGME) resident survey? Comparison between ACGME and in-house GME survey. *Journal of Surgical Education, 76*(6), 387-392.

Fletcher, K.E., Reed, D.A., & Arora, V.M. (2011). Patient safety, resident education and resident well-being following implementation of the 2003 ACGME duty hour rules. *Journal of General Internal Medicine,* Aug 26 (8), 907-919. doi: 10.1007/s11606-011-1657-1

Flexner, A. (1910a). Medical education in America: Rethinking the training of American doctors. *The Atlantic*. Retrieved from http://www.theatlantic.com/magazine/archive/1910/06/medical-education-in-america/306088/

Flexner, A. (1910b). *Medical education in the United States and Canada: A report to the Carnegie Foundation for the Advancement of Teaching*. Retrieved from the Carnegie Foundation website: http://www.carnegiefoundation.org/sites/default/files/elibrary/Carnegie_Flexner_Report.pdf

Freudenberger, J.J. (1974). Staff burnout. *Journal of Social Issues, 30*(1), 159-165.

Gallery, M.E., Whitley, T.W., Klonis, L.K., Anzinger, R.K., & Revicki, D.A. (1992) A study of occupational stress and depression among emergency physicians. *Annals of Emergency Medicine. (21)*1 58-64.

Gopal, R., Glasheen, J.J., Miyoshi, T.J., & Prochazka, A.V. (2005). Burnout and internal medicine resident work-hour restrictions. *Archives of Internal Medicine, 165*(22). doi:10.1001/archinte.165.22.2595

Heard, J., O'Sullivan, P., Smith, C., Harper, R., & Schexnayder, S. (2004). An institutional system to monitor and improve the quality of residency education. Academic Medicine 79(9). Retrieved from http://journals.lww.com/academicmedicine/Fulltext/2004/09000/An_Institutional_System to_Monitor_and_Improve_the.11.aspx

Hellman, D. (2010). Flexner at 100: The pyramid, a new organizational metaphor for academic

medical centers. *The American Journal of Medicine, 123*(7), 571-572. doi: 10.1016/j.amjmed.2009.12.032

HIPAA Space: ICD-10 Code lookup burnout (n.d.) Retrieved from http://www.hipaaspace.com/Medical_Billing/Coding/ICD-10/Diagnosis/Z730

Holt, K.D., Miller, R.S., Philibert, I., Heard, J.K., & Nasca, T.J. (2010). Residents' perspectives on the learning environment: Data from the Accreditation Council for Graduate Medical Education resident survey. *Academic Medicine, 85*(3), 512-518.

Institute of Medicine (n.d.) Retrieved from http://www.iom.edu/Reports/2008/Resident-Duty-Hours-Enhancing-Sleep-Supervision-and-Safety.aspx

Kanste, O., Miettunen, J., & Kyngas, H., (2006). Factor structure of the Maslach Burnout Inventory among Finnish nursing staff. *Nursing and Health Sciences, 8*(4), 201-207. Retrieved from: http://onlinelibrary.wiley.com/doi/10.1111/j.1442-2018.2006.00283.x/full

Kashner, T.M., Henley, S.S., Golden, R.M., Byrne, J.M., Keitz, S.A., Cannon, G.W., ….last author name. (2010). Studying the effects of ACGME duty hours limits on resident satisfaction: Results from VA learners' perceptions survey. *Academic Medicine, 85*(7). doi: 0.1097/ACM.0b013e3181e1d7e3

Lerner, B. (2009, March 3). A life-changing case for doctors in training. *The New York Times*. Retrieved from http://www.nytimes.com/2009/03/03/health/03zion.html

Levenberg, P. (2011, January). The resident survey in accreditation. Retrieved from http://www.acgme.org/acgmeweb/Portals/0/PFAssets/Presentations/240_OphthalmologyAUPO_Presentation_Resident_Survey.pdf

Ludmerer, K.M. (2004). The development of American medical education from the turn of the century to the era of managed care. *Clinical Orthopaedics and Related Research, 422*, 256-262. doi: 10.1097/01.blo.0000131257.59585.b0

Marcelino, G., Cerveira, J., Carvalho, I., Costa, J., Lopex, M., Calado, N., & Marques-Vidal, P. (2013). Burnout levels among Portuguese family doctors: A nationwide survey. *BMJ Open, 2* (3), 1-6. doi: 10.1136/bmjopen-2012-001050

Martini, S., Arfken, C.L., Churchill, A., & Balon, R. (2004). Burnout comparison among residents in different medical specialties. *Academic Psychiatry, 28*(2), 240-242. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/15507560

Maslach, C., Jackson, E.E., & Leiter, M. (1997). *Evaluating stress: A book of resources* (3rd ed.). Lanham, MD: Scarecrow Press.

Niku, N.T. (2004). Resident burnout. *Journal of the American Medical Association, 292*(23), 2880-2889. doi:10.1001/jama.292.23.2880

Philibert, I., Miller, R., Heard, J.K., & Holt, K.K. (2009). Assessing duty hour compliance: Practical lessons for programs and institutions. *Journal of Graduate Medical Education, 1*(1): 166-167.

Ripp, J., Babyatsky, M.D., & Fallar, R. (2011). The incidence and predictors of job burnout in first-year internal medicine residents: A five-institution study. *Academic Medicine, 86*, 1304-1310.

Rosen, I.M., Gimotty, P.A., Shea, J.A., & Bellini, L.M. (2006). Evolution of sleep quantity, sleep deprivation, mood disturbances, empathy, and burnout among interns. *Academic Medicine, 81*(1), 82. Retrieved from http://ovidsp.tx.ovid.com/sp-3.10.0b/ovidweb.cgi?T=JS&PAGE=fulltext&D=ovft&AN=00001888-200601000-00020&NEWS=N&CSC=Y&CHANNEL=PubMed

Santiago, A. (n.d.). What is medical residency training? All about medical residency training. Retrieved from http://healthcareers.about.com/od/medicalschooldoctors/a/MedResidency.htm

Sasaki, M., Kitaoka-Higashiguchi, K., Morikawa, Y., & Nakagawa, H. (2009). Relationship between stress, coping and burnout in Japanese Hospital nurses., *Journal of Nursing Management, 17*(3), 359-365. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2834.2008.00960.x/full

Sen, S., Kranzler, H., Didwania, A., Schwartz, A., Amarnath, S., Kolars, J., Dalack, G., Nichols, B., & Guille, C. (2013). Effects of the 2011 duty hour reforms on interns and their patients: A prospective longitudinal cohort study. *JAMA Internal Medicine, 173*(8). doi: 10.1001/jamainternmed.2013.351

Schuler, D. (2006, February 10). A short history of medical education in the United States. *The Glittering Eye*. [Web log post]. Retrieved from http://theglitteringeye.com/?p=1707

Shanafelt, T.D., Bradley, K.A., & Wipf, J.E. (2002). Burnout of self-reported patient care in an internal medicine residency program. *Annals of Internal Medicine, 136*(5). doi:10.7326/0003-4819-136-5-200203050-00008

Shea, J., Bellini, L., Dinges, D., Curtis, M., Tao, Y., Zhu. J., …Volpp, K. (2014). Impact of protected sleep period for internal medicine interns on overnight call on depression, burnout, and empathy. *Journal of Graduate Medical Education, 6*(2). doi: 10.4300/JGME-D-13-00241.1

Sullivan, M.D., Bucholz, E.M., & Yeo, H. (2012). Join the club: Effect of resident and attending social interactions on overall satisfaction among 4390 general surgery residents. *JAMA Surgery, 147*(5). doi:10.1001/archsurg.2012.27

Syptak, J.M., Marsland, D.W., & Ulmer, D. (1999). Job satisfaction: Putting theory into practice. *Family Practice Management*. Retrieved from http://www.aafp.org/fpm/1999/1000/p26.html

Tang, C. (1998). Assessment of burnout for Chinese human service professionals: A study of factorial validity and invariance. *Journal of Clinical Psychology, 54*(1), 55-58. Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/(SICI)1097-4679(199801)54:1%3C55::AID-JCLP6%3E3.0.CO;2-T/abstract

Theobald, C., Stover, D., Choma, N., Hathaway, J., Green, J., Peterson, N., …Denny, J. (2013). The effect of reducing maximum shit lengths to 16 hours on internal medicine interns' educational opportuntities. *Academic Medicine, 88* (4). doi: 10.1097/ACM.0b013e318285800f

Taradejna, C. (2007). ACGME History: History of medical education accreditation. Retrieved from http://www.acgme.org/acgmeweb/tabid/122/About/ACGMEHistory.aspx

Wallack, M., & Chao, L., (2001). Resident work hours: The evolution of a revolution. *JAMA Surgery, 136*(12). doi:10.1001/archsurg.136.12.1426

West, C.P., Huschka, M.M., & Novotny, P.J. (2006). Association of perceived medical errors with resident distress and empathy: A prospective longitudinal study. *Journal of the American Medical Association, 296*(9). doi:10.1001/jama.296.9.1071

West, C.P., Shanafelt, R.D., & Kolars, J.C. (2011). Quality of life, burnout, educational debt and medical knowledge among internal medicine residents. *Journal of the American Medical Association, 306* (9), 952-960. doi: 10.1001/jama.2011.1247

Yudkowsky, R., Elliott, R., & Schwartz, A. (2002). Two perspectives on the indicators of quality in psychiatry residencies: program directors' and residents'. *Academic Medicine, 77*(1). Retrieved from http://journals.lww.com/academicmedicine/Fulltext/2002/01000/Two_Perspectives_on_the_Indicators_of_Quality_in.14.aspx

APPENDIX A

INSTITUTIONAL REVIEW BOARD – MARSHALL UNIVERSITY

LETTER OF EXEMPTION

MARSHALL UNIVERSITY
www.marshall.edu

Office of Research Integrity

June 7, 2013

Rachael L. Trout
118 McGovran Road
Charleston, WV 25314

Dear Ms. Trout:

This letter is in response to the submitted dissertation abstract titled "An Analysis of Resident Satisfaction at an Independent Academic Medical Center." After assessing the abstract it has been deemed not to be human subject research and therefore exempt from oversight of the Marshall University Institutional Review Board (IRB). The Code of Federal Regulations (45CFR46) has set forth the criteria utilized in making this determination. Since the study does not involve human subjects as defined in DHHS regulation 45 CFR §46.102(f) it is not considered human subject research. If there are any changes to the abstract you provided then you would need to resubmit that information to the Office of Research Integrity for review and determination.

I appreciate your willingness to submit the abstract for determination. Please feel free to contact the Office of Research Integrity if you have any questions regarding future protocols that may require IRB review.

Sincerely,

Bruce F. Day, Ph.D., CIP
Director

APPENDIX B

INSTITUTIONAL REVIEW BOARD – CAMC INSTITUTE

LETTER OF EXEMPTION

CAMC INSTITUTE
RESEARCH AND GRANTS ADMINISTRATION

Institutional Review Board • Institutional Scientific Review Board

Charleston Area Medical Center

Robert C. Byrd Translational Research Center
West Virginia University
Charleston Division

June 20, 2013

John C. Linton, Ph.D.
WVU Dept. of Behavioral Medicine
3200 MacCorkle Avenue SE
Charleston, WV 25304

RE: Your application dated 5/20/2013 regarding study number 1997349: An Analysis of Resident Satisfaction at an Independent Academic Medical Center

Dear Dr. Linton

This message is your official notification that your project / survey

An Analysis of Resident Satisfaction at an Independent Academic Medical Center, Study Number: 1997349 does not meet the definition of research under the Code of Federal Regulations Title 45 Part 46.102(d); therefore is not subject to review by the Institutional Review Board.

Sincerely,

Carrie Croson/ps

Carrie Croson, BA, CIP
Research Monitoring Coordinator

cc: Rachael Trout

APPENDIX C

SAMPLE SURVEY INSTRUMENT

CAMC/WVU Overall Evaluation of Intern and Residency Programs 2012

Thank you for sharing your response to each question. Fill in the response that best reflects your opinion.

Today's date: [ ] / [ ] / [ ] [ ] [ ] [ ] Age: [ ] [ ] Gender: ○ Male ○ Female

Post Graduate Level:

○ PG 1/Intern ○ PG-3 ○ PG-5

○ PG-2 ○ PG-4 ○ PG 6/7

Graduate of US Medical School?

○ Yes ○ No

Graduate of West Virginia School?

○ Yes ○ No

Programs

○ Family Practice
○ Internal Medicine
○ Medicine Pediatrics
○ General Psychiatry
○ Obstetrics-Gynecology
○ General Surgery
○ Pediatrics
○ Osteopathic Internship
○ Medicine-Psychiatry
○ Urology
○ Emergency Medicine
○ Pharmacy
○ Vascular Surgery
○ Geriatrics Fellow

Track (Internal Medicine, Pediatrics, Family Practice only)

○ Dual Track ○ Allopathic (only)

1. Department Chair/Director

«Dept_Chair»

	Poor	Fair	Good	Very Good	Excellent	Not Applicable
a. Effectiveness of educational leadership	○	○	○	○	○	○
b. Support for education	○	○	○	○	○	○
c. Availability to residents	○	○	○	○	○	○

d. Comments: _____

2. Program Director

«Prog_Director»

	Poor	Fair	Good	Very Good	Excellent	Not Applicable
a. Effectiveness of program leadership	○	○	○	○	○	○
b. Availability to residents	○	○	○	○	○	○
c. Quality of resident orientation	○	○	○	○	○	○
d. Clarity of expectations of residents	○	○	○	○	○	○
e. Evaluations reflect your strengths and weaknesses	○	○	○	○	○	○
f. Quality of guidance on what you need to do to improve	○	○	○	○	○	○

g. Comments: _____

3. Faculty	Poor	Fair	Good	Very Good	Excellent	Not Applicable
a. Medical/ Clinical knowledge	O	O	O	O	O	O
b. Clinical skills	O	O	O	O	O	O
c. Care and compassion for patients	O	O	O	O	O	O
d. Respect for residents as a team member	O	O	O	O	O	O
e. Respect for residents abilities	O	O	O	O	O	O
f. Teaching skills	O	O	O	O	O	O
g. Interest in teaching	O	O	O	O	O	O
h. Accessibility/approachability	O	O	O	O	O	O
i. Provision of feedback	O	O	O	O	O	O
j. Appropriate level of supervision	O	O	O	O	O	O

k. Comments: _____

4. Resident Support	Poor	Fair	Good	Very Good	Excellent	Not Applicable
a. Program staff helpfulness to residents	O	O	O	O	O	O
b. Program staff effectiveness in dealing with resident issues	O	O	O	O	O	O
c. Institutional administration helpfulness to residents	O	O	O	O	O	O
d. Institutional administration effectiveness in dealing with resident issues	O	O	O	O	O	O
e. GME staff helpfulness to residents	O	O	O	O	O	O
f. GME staff effectiveness in dealing with resident issues	O	O	O	O	O	O
g. Confidentiality of support systems	O	O	O	O	O	O
h. Resident stipends	O	O	O	O	O	O
i. Resident benefits	O	O	O	O	O	O

j. Comments: _____

5. Resident Input	Poor	Fair	Good	Very Good	Excellent	Not Applicable
a. Extent of resident input in faculty evaluations	○	○	○	○	○	○
b. Resident input on the extent to which the program fulfills its stated goals and objectives	○	○	○	○	○	○
c. Extent of resident input in patient care quality assurance	○	○	○	○	○	○
d. Residents' ability to express opinions and concerns without fear of retaliation	○	○	○	○	○	○
e. Impact of resident input	○	○	○	○	○	○

f. Comments: _____

6. Semi Annual Evaluations (Only PG 2 & above)	Poor	Fair	Good	Very Good	Excellent	Not Applicable
a. Benefits of semi annual or quarterly evaluations	○	○	○	○	○	○
b. Evaluation process	○	○	○	○	○	○
c. Program director taking enough time for evaluation	○	○	○	○	○	○
d. Informative	○	○	○	○	○	○

e. Comments: _____

7. Quality of Life	Poor	Fair	Good	Very Good	Excellent	Not Applicable
a. Your ability to balance residency and personal commitments	○	○	○	○	○	○
b. Your ability to participate in family/community activities	○	○	○	○	○	○
c. Your ability to function optimally	○	○	○	○	○	○

d. Comments: _____

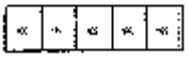
8. Satisfaction with Program	Poor	Fair	Good	Very Good	Excellent	Not Applicable
a. Extent to which your educational experience this year will prepare you for your career objectives	○	○	○	○	○	○
b. Match of your educational experiences with program's stated goals	○	○	○	○	○	○
c. Your opportunity to participate in research	○	○	○	○	○	○
d. Your role as a member of a team	○	○	○	○	○	○

e. Comments: _____

9. ADDITIONAL COMMENTS OR SUGGESTIONS FOR IMPROVEMENT

_____

_____



ASSESSMENT OF RESIDENT WORK HOUR REQUIREMENTS

1. Are you familiar with current policies in your program at CAMC regarding restriction of resident work hours?

○ Yes ○ No

2. Have you received a copy (hard copy or electronic) of the current policy for resident work hours for your program at CAMC?

○ Yes ○ No

3. Within the past 4 work weeks, have you experienced a work load, inclusive of in-house call activities, in excess of 80 hours per week, averaged over the four-week period?

○ Yes ○ No

4. Within the past 4 work weeks, have you had a minimum of a continuous 24 hour period per week free from all clinical, educational, and administrative activities, averaged over the four-week period?

○ Yes ○ No

5. Within the past 4 work weeks, has your in-house call schedule been limited to no more than every 3rd night, averaged over the four-week period?

○ Yes ○ No

6. Within the past 4 work weeks have you consistently experienced a minimum of a 10 hour period for rest and personal activities between daily duty periods and after in-house call?

○ Yes ○ No

7. Within the past 4 work weeks, how would you best describe your level of fatigue as a result of your assigned responsibilities from your residency program?

○ Lower than usual. ○ About the same as usual. ○ More than usual.

8. Overall, how would you describe your level of stress and fatigue?

○ Minimal ○ Average ○ Excessive

VITA

RACHAEL E. TROUT

Education

2014	Ed.D. Educational Leadership	Marshall University Huntington, WV 25755
2009	Master of Arts, Leadership Studies	Marshall University Huntington, WV 25755
1993	Bachelor of Arts, Education	Marshall University Huntington, WV 25755

Work Experience

2004-Present	Administrator Department of Medical Education West Virginia University- Charleston Division
2002-Present	Administrator Department of Internal Medicine West Virginia University- Charleston Division
2001-2002	Manager Department of Internal Medicine West Virginia University- Charleston Division
1998-2001	President/Owner STAT Services, Inc.
1997-1998	Medical Claims Manager Rapid Electronics, Inc.
1993-1997	Office Assistant Asbestos Air Monitoring Technician Triad, Inc.

Publications

Gessford, A., John, M., Nicholson, B., & Trout R.E. (2012). Marijuana induced hyperemesis: A case report. *West Virginia Medical Journal, 6*, 20-22.

John M., Trout R.E., Nicholson, B., & Cunningham, M. (2010). Cocaine abuse among patients: A study at the Charleston Area Medical Center. *West Virginia Medical Journal, 3*, 78-81.

Smith, A., John, M., & Trout, R.E. (2009). Elevated cardiac troponins in sepsis: What do they signify? *West Virginia Medical Journal, 4*, 29-32.